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Personal and Situational Factors Influencing Intrinsic Interest of Adolescent Girls in School Physical Education: a structural equation modelling analysis

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ABSTRACT This study assessed the influence of individual and contextual factors on adolescent girls' interest in school physical education (PE). Specifically, girls ($N = 700$) were assessed on: (a) perceptions of their PE class climate, using the Perceived Motivational Climate Scale (PMCS, Cury et al., 1994; (b) dispositional achievement goal orientations, using the French version of the Perception of Success Questionnaire (POSQ, Durand et al., in press; and (c) the interest and competence subscales from the French version of the Intrinsic Motivation Inventory (IMI, Cury et al., 1994a). Structural equation modelling analysis, using LISREL VII, showed an excellent fit with the hypothesised model. Specifically, situational class climate was found to be more important than individual goals in influencing pupil interest in PE. However, perceived competence also influenced interest, as did a mastery goal orientation. Results are discussed in the context of theoretical propositions of goal perspectives theory and practical issues of enhancing adolescent girls' interest in physical education.

Motivation theory in education utilising a goal perspectives approach (Nicholls, 1989), as well as its application to the field of sport and physical education (PE) (Duda, 1992; Roberts, 1992; Goudas & Biddle, 1994), suggests that dispositional factors, such as perceived competence and achievement goal orientations, as well as situational factors, such as perceived class climate in PE, influence intrinsic interest shown by the pupil. Deci and Ryan (1980) say that an individual is intrinsically motivated in a situation when he or she feels competent and self-determined or autonomous. Some indicators of intrinsic motivation are high effort, feelings of competence and interest, and low levels of tension and anxiety.

Recent research (Van Wersch *et al.*, 1992) suggests that interest in school PE declines markedly for girls as they progress through the teenage years, a trend not shown strongly for boys. However, few studies have addressed the likely determinants of such a change in interest, even though the motivation of all adolescents towards physical activity is important for a variety of educational and health-related reasons. This study, therefore, is an investigation into likely motivational determinants of interest shown in PE by a large group of adolescent girls.

Dispositional Aspects of Accomplishment and Intrinsic Interest

It is now well established that competence can be perceived in different ways in achievement situations. For some, success is defined primarily in terms of normative comparisons, such as winning or showing superior performance relative to others. Such individuals are 'ego orientated' as they pursue ego or social comparison goals (Duda, 1992). For others, feelings of competence and success are linked to personal improvement and task mastery. This is more of a self-referenced perspective and describes people adopting primarily a task or mastery orientation (Duda, 1992; Roberts, 1992). (For reviews of this perspective in French, see Famose, 1990, 1991.)

Task and ego goal orientations, however, are often found to be uncorrelated, so individuals could be high in both orientations, low in both, or high only in one (Fox *et al.*, 1994; Goudas *et al.*, 1994). These studies have shown that a task orientation is motivationally adaptive, either singly or in combination with a high ego orientation.

The theory of goal perspectives, both in classroom education (Nicholls, 1989; Heyman & Dweck, 1992), and physical education (Cury *et al.*, 1993; Goudas *et al.*, 1994), suggests that the goals pursued by the student will influence the level of intrinsic motivation or interest shown. More precisely, there is greater support for a mastery goal encouraging intrinsic interest than for a social comparison goal (Duda *et al.*, 1992). In fact, a social comparison goal has sometimes been seen to be motivationally maladaptive. It seems that social comparison can lead individuals to consider a task as a means to an end (such as to be the best); requiring or demonstrating high effort may actually be a sign of low ability and as the goal is to show success relative to others, this might diminish feelings of self-determination, itself a critical part of intrinsic motivation (Goudas & Biddle, 1994).

On the other hand, students who are strongly orientated towards mastery perceive effort as an important cause of success and see effort as pleasant and not a sign of low ability. For other authors, it is not only the goal orientation that influences intrinsic interest, but the degree of correspondence between the initial goal and the outcome (Butler, 1987, 1992; Sansone *et al.*, 1989). In addition, the link between goal orientation and intrinsic interest may also be mediated by perceptions of competence. Students high in social comparison orientation will usually retain interest only when the

situation permits them to retain a high perception of their ability or competence. As Duda (1992, p. 74) states:

it seems that ego involvement can result in decreased intrinsic interest in and enjoyment of a sport activity. However, at the present time, there is more support for the proposition that task involvement tends to nourish intrinsic motivation in sport.

Situational Aspects of Accomplishment and Intrinsic Interest

One determinant of individual achievement goal orientation is what Ames (1992) and Nicholls (1989) call the 'motivational climate' of the school class. This can be influenced by such factors as the nature of the tasks to be learned, advice and feedback given, the allocation of authority between teacher and pupil, student choice, etc.

Ames (1992) refers to the six 'T-A-R-G-E-T' areas of climate: *Task*, *Authority*, *Recognition*, *Grouping*, *Evaluation* and *Time*. *Task* refers to class activities and their design (e.g. active involvement in tasks by the children), *authority* refers to student participation in the instructional process, such as involving them in decision-making, *recognition* refers to distribution and opportunities for rewards (e.g. for individual progress), *grouping* is concerned with how students work together, *evaluation* concerns monitoring and feedback arrangements, *time* refers to pace of learning and class management, such as practice schedules.

Two main dimensions of motivational climate in classroom and PE lessons, as well as in sport outside of education, have been identified, these being 'mastery' ('learning') and 'performance' ('social comparison') (Walling *et al.*, 1993; Goudas & Biddle, 1994; Papaioannou, 1994; Biddle *et al.*, 1995; Cury *et al.*, 1994). A class climate emphasising one or other of these perspectives may well lead to the adoption of stronger task or ego class *involvement* and, in the long term, task or ego *orientation*. Duda (1992) and Nicholls (1989) propose that ego or task involvement will be a function of perceived situational factors (i.e. climate) and of individual differences in the predisposition towards achievement goals (i.e. goal orientation).

Motivational climate may also be related to perceived competence. Duda (1992) suggests that a mastery climate, because of its emphasis on temporal progress and task mastery, is more likely to favour high-ability perceptions in comparison to a performance climate where social comparison is more in evidence. In a task climate, and with a task orientation, pupils are more likely to perceive effort as the primary determinant of success and self-esteem is less threatened in the case of 'failure'. Conversely, a performance climate and ego goal orientation are associated with pupils viewing ability as the primary determinant of success and, in the case of failure, perceived competence can be affected negatively. It is possible, therefore, that perceptions of an increasing performance-orientated PE class climate could be associated with reduced ability perceptions, at least for 'weaker' pupils more prone to failure in the normative sense.

Research in PE and sport has also shown that high perceptions of a mastery climate are correlated with intrinsic interest, whereas performance climate scores are either negatively correlated with intrinsic interest or not correlated at all (Vallerand *et al.*, 1986; Durand *et al.*, 1991; Seifriz *et al.*, 1992; Cury *et al.*, 1993; Goudas & Biddle, 1994; Papaioannou, 1994). Dispositional factors of goals and perceived competence will also affect intrinsic interest. The key point here is that the determinants of motivation

are largely cognitive, as it is the perception the pupils have of competence and success, as well as the class climate, that are key, rather than the lesson content *per se*.

However, much of the research that has uncovered the relationships reviewed so far has tended to investigate variables in isolation. It appears opportune, therefore, to test these different propositions in a more comprehensive manner by testing a model of the proposed relationships between situational climate, dispositional goals, perceived competence and intrinsic interest. To test such a model, the method of structural equation modelling was selected. A causal model was constructed based on proposed relationships from prior literature. LISREL software (Joreskog & Sorbom, 1989) is then applied to test the adequacy of fit of our data to the specified model.

For the model, the following proposals have been formulated: Perceived competence will positively influence pupils' interest in PE; mastery goal orientation will enhance interest, whereas a social comparison goal will reduce interest or have no effect, the perception of class climate will positively influence its corresponding dispositional goal orientation, mastery climate will be positively associated with perceived competence whereas a social comparison climate will be negatively correlated, or not correlated at all, with perceived competence. The same is proposed for the influence of climate dimensions on intrinsic interest.

Method

Participants

Girls attending four schools in Paris participated in the study ($N = 700$). Their ages ranged from 13 to 16 years (mean = 14.5, $SD = 0.7$) and the sample was diverse in socioeconomic background.

Measures

The Perceived Motivational Climate Scale (PMCS): This instrument is a modified French version of the PE Class Climate Scale (PECCS) from Goudas and Biddle (1994). It has been found to be valid and reliable (Cury *et al.*, 1994). Nine items comprising two subscales—'pursuit of progress by pupils' and 'promotion of learning by teacher'—assess the mastery dimension of the perceived climate of the PE class. Ten items comprising three subscales—'pursuit of comparison by pupils', 'worries about mistakes' and 'promotion of comparison by teacher'—assess the social comparison dimension of the perceived PE class climate (see Biddle *et al.*, 1995). For the present study, the authors have only used the scores on the two main dimensions (mastery and social comparison). When completing the PMCS, the students were asked to respond by making reference to what occurred most often in their physical education class. Responses were indicated on five-point Likert-type scales, from 'don't agree at all' (1) to 'agree completely' (5).

The Perception of Success Questionnaire (POSQ). To assess mastery and social comparison dispositional goals of the pupils, the POSQ, developed by Roberts and Ballague (1989), and validated in France by Durand *et al.* (in press), was employed. Six items assess the mastery disposition and six items assess the social comparison disposition. When completing the POSQ, pupils were requested to think of when they felt most successful

in sport. Responses were indicated on five-point Likert-type scales, anchored by 'don't agree at all' (1) and 'agree completely' (5).

The Perceived Competence and Interest Subscales from the Intrinsic Motivation Inventory (IMI). Based on the work of Ryan (1982), and developed in the sport context by McAuley *et al.* (1989) to measure intrinsic motivation following sports tasks, the IMI was reworded in order to reflect the context of PE lessons by Goudas and Biddle (1994), and validated in France by Cury *et al.* (1994). For this study, the authors only used two of the four subscales of the inventory, interest and competence, and excluded tension and effort. Five items assessed pupils' interest for PE and four items assessed perceived competence. Responses were indicated on five-point Likert-type scales, from 'don't agree at all' (1) to 'agree completely' (5).

Procedure

Pupils were requested to answer questions anonymously on their motivation concerning sport and PE. Questionnaires were completed in about 20 minutes and no pupils refused to take part.

Results

The psychometric qualities of the different scales used in the study were assessed first. Items from the PMCS, the POSQ and the two subscales of the IMI were analysed using exploratory factor analysis and Cronbach's alpha coefficient for internal consistency. Principal components factor analyses were conducted separately on the responses to the three questionnaires. Factors were selected if they possessed an eigenvalue greater than 1 and accounted for at least 5% of the variance. Also, only factor loadings exceeding 0.40 were considered. Varimax and oblimin rotations were calculated, producing similar results.

Factor Structure and Internal Consistency of the Perceived Motivational Climate Scale (PMCS)

Table I presents the results of the factor analysis and the internal consistency of the PMCS. Five factors emerged that explained 58.8% of the variance, each showing good internal consistency using Cronbach's alpha and according to Nunnally (1978). Three items were deleted because they did not meet the criteria of loading on one factor. The 16 items fell into the five categories hypothesised: pursuit of progress by pupils, pursuit of comparison by pupils, worries about mistakes, promotion of learning by teacher and promotion of comparison by teacher. Table II presents the results of a second-order factor analysis, by using the five factors as variables. The two expected factors (mastery and social comparison dimensions) emerged explaining 65.7% of the variance; each showed good internal consistency. Moreover, the results (interfactor correlation = -0.17) confirm prior research which has stated that the two perceived climate dimensions are largely independent factors (Walling *et al.*, 1993; Goudas & Biddle, 1994; Biddle *et al.*, 1995; Cury *et al.*, 1994). For the present study, the authors used the total score for the pupils on each of the two main higher-order dimensions.

TABLE I. Factor analysis (orthogonal transformation solution-varimax) from the PMCS

Item: in my PE class...	Factor 1: pursuit of progress by pupils	Factor 2: pursuit of comparison by pupils	Factor 3: worries about mistakes	Factor 4: promotion of learning by teacher	Factor 4: promotion of comparison by teacher
item 1	0.766				
item 6	0.736				
item 11	0.769				
item 15	0.585				
item 2		0.818			
item 7		0.812			
item 12		0.531			
item 5			0.576		
item 14			0.707		
item 18			0.800		
item 8				0.789	
item 13				0.809	
item 16				0.615	
item 4					0.825
item 9					0.632
item 17					0.628
Eigenvalue	3.464	2.421	1.294	1.154	1.077
% of variance	21.7	15.1	8.1	7.2	6.7
Cronbach alpha	0.741	0.693	0.733	0.702	0.771

Note: Only factor loadings greater than 0.40 are printed.

TABLE II. Second-order factor analysis (orthogonal transformation solution-varimax) from the PMCS subscales

Subscales	Factor 1: mastery dimension	Factor 2: social comparison dimension
Pursuit of progress by pupils	0.863	
Promotion of learning by the teacher	0.857	
Pursuit of comparison by pupils		0.694
Worries about mistakes		0.726
Promotion of comparison by the teacher		0.711
Eigenvalue	1.832	1.453
% variance	36.6	29.1
cronbach alpha	0.793	0.741

Factor Structure and Internal Consistency of the Perception of Success Questionnaire (POSQ)

As indicated in Table III, the two expected factors were found (social comparison goal and mastery goal), explaining 57.5% of the variance and each showing good internal consistency. As for the two dimensions of perceived climate, results confirmed that the social comparison and the mastery goals are independent (interfactor corre-

TABLE III. Factor analysis (orthogonal transformation solution-varimax) from the POSQ

Item: I feel most successful in sport when...	Factor 1: orientation to social comparison	Factor 2: orientation to mastery
item 1	0.805	
item 3	0.876	
item 5	0.869	
item 7	0.784	
item 9	0.694	
item 11	0.822	
item		0.681
item 4		0.763
item 6		0.683
item 8		0.62
item 10		0.712
item 12		0.717
Eigenvalue	4.012	2.895
% of variance	33.4	24.1
Cronbach alpha	0.896	0.787

lation = 0.06); this is consistent with prior research (e.g. Duda *et al.*, 1992; Fox, *et al.*, 1994; Treasure & Roberts, 1994).

Factor Structure and Internal Consistency of the Perceived Competence and Interest Subscales

As indicated in Table IV, the two factors hypothesised were found (perceived competence and interest), explaining 63.8% of the variance. Two items were deleted because they did not meet the criteria of loading on one factor. The two subscales had good internal consistency.

TABLE IV. Factor analysis results (orthogonal transformation solution-varimax) from the perceived competence and the interest subscales

Item	Factor 1: perceived competence	Factor 2: interest
item 2	0.869	
item 5	0.814	
item 6	0.838	
item 1		0.525
item 4		0.764
item 7		0.646
item 9		0.744
Eigenvalue	3.185	1.279
% of variance	45.5	18.3
Cronbach alpha	0.821	0.723

Note: Only factor loadings greater than 0.40 are printed.

TABLE V. Indexes of fit for the structural equation model tested

χ^2	8.940
df	4
P	0.0626
χ^2/df ratio	2.235
GFI	0.996
AGFI	0.978
RMSR	0.0182

A Structural Equation Modelling Analysis

Using LISREL (Joreskog & Sorbom, 1989), and the maximum likelihood method, work was carried out on two aspects. Firstly, it was the evaluation of the theoretical model proposed earlier by assessing the fit of the data. Secondly, estimations of path coefficient values quantified the influence of situational and dispositional variables on intrinsic interest.

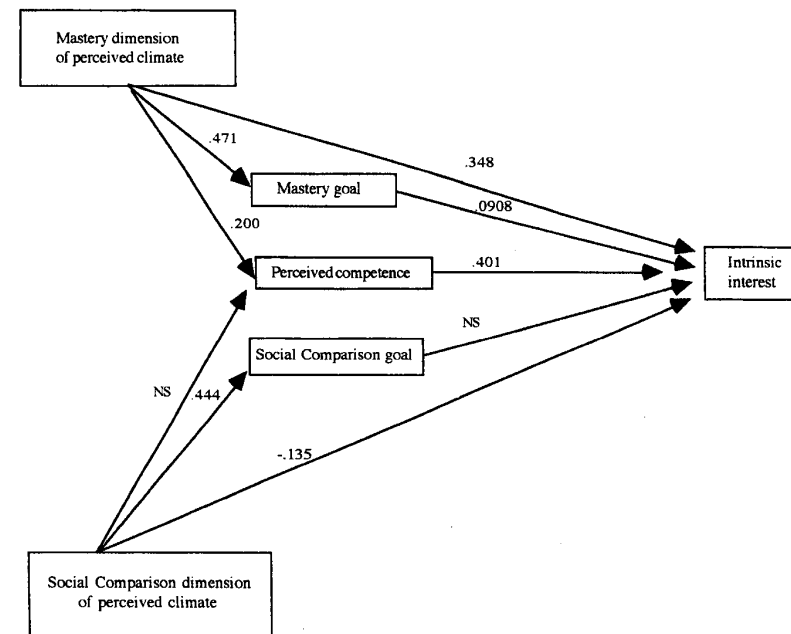
The chosen model corresponded well with the observed data. The chi-square was not significant ($\chi^2 = 8.940$, $p = 0.0626$), despite the large sample size, which indicates that the pupils' answers do not differ from the theoretical model proposed (see Table V). Moreover, other results confirm the good fit of the data to the model: the χ^2/df ratio is less than 3, which is considered satisfactory by Joreskog (1969), the Root Mean Square Residual (RMSR) is low, whereas the Goodness of Fit Index (GFI) and the Adjusted Goodness of Fit Index (AGFI) are very close to 1 (see Table V).

As far as direct effects are concerned (see Fig. 1), perceived ability is the factor which positively influences interest the most. The effects of individual goals on interest are relatively weak (no effect of the social comparison orientation and a small coefficient for the mastery orientation), in relation to situational orientation effects. Moreover, the climate perception positively influences the corresponding individual goal. Lastly, the social comparison dimension does not affect perceived ability, whereas the mastery dimension is positively associated. As far as mediators are concerned, part of the effect of the mastery dimension of climate on interest is mediated by the mastery goal and perceived ability (see Fig. 1).

Discussion

The indexes of fit suggest an excellent fit of the data to the proposed model. Consistent with theoretical propositions of intrinsic motivation theory (Deci & Ryan, 1980; Ryan, 1982), adolescent girls' perceived ability was an important factor determining intrinsic interest in PE. However, as Sansone (1986) has stated, competence perceptions are only important for interest if competence itself is valued in that context. It could be argued that competence is often highly valued in PE, although the nature of competence value in girls requires further study.

An important finding is that intrinsic interest appears to be influenced more by situational climate than by dispositional goals. Seifriz *et al.* (1992), in a study of volunteer basketball players, found that individual goals were better predictors of interest than climate. We suggest that in the context of voluntary sport participation, dispositional goals may well be strong predictors of interest (Famose *et al.*, 1992).



Note. Paths with N.S. have no significant effect.

FIG. 1. Structural equation model for the individual and situational origin of interest.

However, when an activity is compulsory, such as school PE, situational factors may play a more important role. Moreover, our hypothesis was also confirmed in finding that dispositional goals were strongly influenced by their corresponding climate dimension, suggesting a shaping effect of climate on goals (Nicholls, 1989; Ames, 1992). From a practical standpoint, it is noteworthy to find that climate has an important impact on intrinsic interest.

Finally, and in accordance with our predictions, the results showed that the two dispositional goals influence intrinsic interest differentially. Mastery goal orientations were shown to enhance interest, whereas social comparison orientations were unrelated to interest. Moreover, the mastery goal mediated the effects of mastery climate. Overall, pupils who perceive their class to be mastery orientated are more likely to feel competent, have a mastery goal orientation and feel intrinsically interested in the PE class. These findings provide information on possible intervention strategies for enhancing the intrinsic interest of adolescent girls in school physical education.

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